

**A NEW SUBSPECIES OF *BINDAHARA MEEKI* ROTHSCILD &
JORDAN (LEPIDOPTERA: LYCAENIDAE) FROM NEW IRELAND,
PAPUA NEW GUINEA**

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Abstract

Bindahara meeki kolmaui ssp. nov. is described and illustrated from Central New Ireland, Bismarck Archipelago. Detailed morphological and structural comparisons are made with the nominotypical subspecies from mainland Papua and Irian Jaya. The immature stages of *B. m. kolmaui* are described and *Salacia* sp. nr *disepala* (Hippocrateaceae) is recorded as a foodplant.

Introduction

The genus *Bindahara* Moore was previously considered to contain three species, *B. phocides* (Fabricius), *B. meeki* (Rothschild & Jordan) and *B. arfaki* Bethune-Baker, until Parsons (1998) showed that the latter two taxa are conspecific, *B. meeki* having priority. Parsons (1998) recognised that only males were known of *B. meeki* and only females of *B. arfaki*, hence prior confusion can be attributed to the extreme sexual dimorphism.

Depositories are abbreviated as follows: ANIC – Australian National Insect Collection, CSIRO, Canberra; CJMC – Private collection of C. J. Müller.

***Bindahara meeki kolmaui* ssp. nov.**

(Figs 1-5, 7-9, 11)

Type material. Holotype ♂ (ANIC genitalia slide No. 13095), PAPUA NEW GUINEA: Schleinitz Mts., 1260 m, Central New Ireland, 24.vii.1998, C. J. Müller (in ANIC). Paratypes: 1 ♂, same data as holotype but 27.vii.1998 (CJMC); 1 ♀, same data as holotype but ex-ova, emerged 1.ix.1998, pupated 19.viii.1998 (ANIC); 1 ♀, same data as holotype but 24.vii.1998 (CJMC).

Description. Male (Figs 1, 2, 5). Forewing length 20 mm; antenna 12 mm. Head black with eye ringed white anteriorly; antenna black, ringed white, with club tipped orange-brown, nudum proximal to club ventrally grey-brown; labial palpus long, black dorsally, white beneath. Thorax black with fine brown hairs above, beneath grey; legs pale grey. Abdomen black, white ventrally. Forewing with costa bowed strongly near base, termen nearly straight; above black with a broad area, excluding cell and central median area, iridescent purple, visible only at certain acute angles, cilia black; beneath, ground colour dark grey-brown, pale brown from base to postmedian area beneath vein CuA₂, nine white bars of variable width running approximately normal to costa, termen and submarginal line tending orange towards dorsum, postmedian pair of lines becoming congruous at vein CuA₁, median pairs of lines intersecting at costa. Hindwing with long orange

tail at vein CuA_2 , termen stepped abruptly, distally between veins CuA_1 and CuA_2 , lobed at tornus; above black with bright orange tornal area from vein M_2 irregularly to median area of dorsum, paler progressively towards inner margin, lobe black with metallic blue centre, cilia black along apex and anterior one-third of termen, orange along remainder, large disc-shaped sex brand in basal area between cell and vein $Sc+R_1$; beneath, ground colour brown-black with a series of white bars orientated obliquely to costa, from base to termen, postmedian and marginal lines merging and becoming progressively orange towards tornus, median pale line very obscure, white median bars congruent at junction of cell and vein M_1 , bottom of cell and vein CuA_1 broadly orange, an irregular black bar oblique to dorsum from median to postmedian area, two black spots, uppermost oval in shape, proximally blue to white, lobe broadly black, metallic blue at tornus.

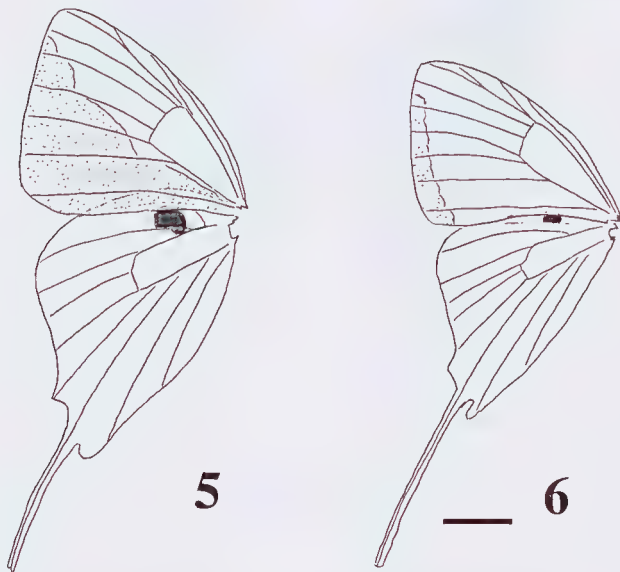
Genitalia (Fig. 11). Genitalic ring oval; sociuncus broad and U-shaped anteriorly; brachium long, apically slender, strongly dipping; valva long, slender, somewhat flattened laterally, median distal blunt processes laterally, enlarged and squared apically; phallus elongate, pointed apically, with dense setae subapically.

Female (Figs 3, 4). Forewing length 19 mm; antenna 10 mm. Head deep grey, white anteriorly and ventrally; antenna black dorsally, whitish-grey ventrally, club grey-brown; tipped orange-brown, labial palpus long, black, beneath basal two segments white. Thorax grey with flimsy hairs laterally, beneath whitish-grey; legs grey dorsally, white ventrally. Abdomen grey dorsally, white ventrally. Forewing with costa bowed near base and inner margin near tornus, termen fairly straight; above grey-black with broad white median area extending from lower distal portion of cell to inner margin and near base, boundary with ground colour gradational, basal area below cell with scattering of grey scales; beneath, ground colour white, with a series of black bars running normal to costa (broad bar in sub-basal area reaching to near dorsum, two narrower black bars in median to postmedian area and reaching to vein CuA_2 , two broad marginal and submarginal bars, meeting at tornus). Hindwing with apex rounded, termen straight to vein CuA_1 , stepped between vein CuA_1 and tornus and with long tail at vein CuA_2 , lobed conspicuously; above white with distal one-third black, basal area with scattered grey scales, vein $1A+2A$ heavily black, and to inner margin grey, narrow white line just proximal of termen and also in centre of tail which is otherwise black with faint traces of pale metallic blue, lobe black with metallic blue centre, cilia black; beneath white with distal one-quarter black, partially bisected by submarginal band of elongate bluish-white spots, a black bar, running obliquely to costa from base to bottom of cell, an irregular black bar from base to tornus, congruous with dorsum, a black bar, oblique to dorsum from near base to vein $1A+2A$, a narrow band of white subterminal spots, two elongated metallic blue tornal spots, two white spots proximal to these, postmedian area near tornus bright yellow, tail black with white centre, dorsum broadly black, cilia black.



Figs 1-4. Adults of *Bindahara meeki kolmaui* ssp. nov. Odd numbers upperside, even numbers underside. (1, 2) male; (3, 4) female.

Etymology. The new taxon is named in honour of Mr Gabriel Kolmau, Kandauan Village, New Ireland, for his hospitality and friendship to one of us (CJM) during field research undertaken in this study.



Figs 5-6. Adult male uppersides of *Bindahara meeki* subspecies, showing extent of iridescent purple (stippled) and sex brand (filled). (5) *B. m. kolmaui*; (6) *B. m. meeki*.

Life history

Foodplant (Fig. 10). Fruit of *Salacia* sp. nr *disepala* (Hippocrateaceae).

Egg. Diameter 0.85 mm, wider than high, white with bluish tinge, strongly pitted with fine spines along pit peripheries.

Larva. Final instar (Fig. 7) 21 mm long, flattened laterally, especially anteriorly, distally flanged and indented between segments, with conspicuous setae, glossy blue-black, anteriorly and around periphery orange-brown, posteriorly with flange blue-green, segments 6 to 8 white, becoming progressively pink near maturity, segment 7 with a black dorso-lateral patch, anal plate brown.

Pupa (Figs 8, 9). Length 15 mm, with covering of short fine setae, longer anteriorly, indented above eyes, brown with segments 6 and 7 cream-brown, faint dorsal line brown, dark brown dorso-lateral markings anteriorly. Attached by cremaster and central girdle.

Discussion

Bindahara meeki, described by Rothschild and Jordan (1905), is one of the rarer species in the Australian region. It is fairly widely distributed from Misool and mainland Irian Jaya to eastern Papua New Guinea, yet only six specimens were known to Parsons (1998) from Papua. A further female is known from Mumeng, Morobe Province, PNG, March 1990 (CJMC).

B. meeki kolmaui is a striking new taxon and its presence on New Ireland suggests that *B. meeki* eventually will be discovered on the intervening island of New Britain. Parsons (1998) records the vertical range of *B. m. meeki* in Papua as 0-1800 m. The type series of *B. m. kolmaui* was taken at 1260 m (Fig. 13) although it may occur at lower elevations in New Ireland.

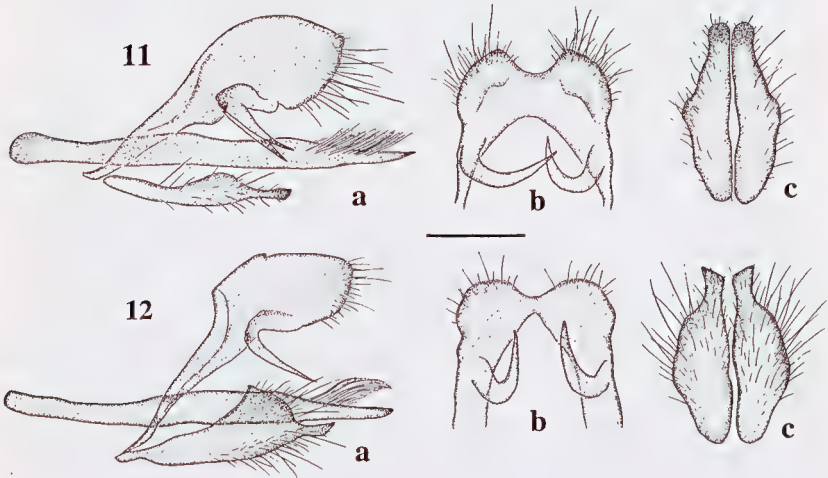
Adults of *B. m. kolmaui* may be distinguished readily from the nominate subspecies in both sexes. The male is more distinctly marked beneath than that of *B. m. meeki*., the pale striae in the tornal region of the hindwing in the latter taxon are replaced with dark, more extensive markings in the new subspecies. Above, the narrow terminal area of iridescent purple in *B. m. meeki* is replaced by a large area of similar colouring covering the majority of the forewing (Figs 5, 6). The sex mark at the costal base of the hindwing above is much larger in *B. m. kolmaui* than in the nominotypical subspecies. Females are very well marked on the underside of both wings; the vestigial bars in *B. m. meeki* are extended considerably in *B. m. kolmaui*, giving a superficial resemblance to a miniature 'five-bar' *Graphium* Scopoli (e.g. *G. nomius* (Esper), *G. aristus* (Stoll): Papilionidae). The yellow and metallic blue markings in the hindwing are extensive and bright in *B. m. kolmaui*. In addition, the wing shape is different between females of the two subspecies. Females of the nominate taxon possess much broader and more rounded wings, the termen in *B. m. kolmaui* being comparatively straight.

The male genitalia of *B. m. meeki* and *B. m. kolmaui* (Figs 11, 12) are very distinct, suggesting that the two may not be conspecific. The sociuncus in *B. m. meeki* is considerably broader and more rounded dorsally than in *B. m. kolmaui*. In addition, the sociuncus is more flattened laterally in *B. m. meeki* and the brachium is blunt and broad. The valvae of *B. m. kolmaui* are strongly flattened and unlike those of *B. m. meeki* are apically blunt (sharply pointed in *B. m. meeki*). The phallus of *B. m. kolmaui* is tapered to a sharp point apically, whilst in *B. m. meeki* it is comparatively blunt.

Adults of *B. m. kolmaui* were collected in the top of a flowering rainforest tree (probably *Acmena* sp.) some 20 m above the ground. Specimens were flying with *Deudorix woodfordi* Druce, *D. niepelti* Joicey & Talbot, *D. epijarbas* (Moore) and an undescribed species of *Deudorix* Hewitson. Several days spent in the canopy saw only very brief periods of sunshine and once the sun was obscured insect activity lessened considerably. The probable arboreal habits of *Bindahara meeki* may explain the paucity of records.



Figs 7-10. Early stages and foodplant of *B. m. kolmaui*. (7) mature larva, dorsal view; (8) pupa, dorsal view; (9) pupa, lateral view; (10) *Salacia* sp. nr *disepala*.



Figs 11-12. Male genitalia of *Bindahara meeki*. (11) *B. m. kolmaui*. (a) lateral view; (b) sociuncus, dorsal view; (c) valvae, ventral view. (12) *B. m. meeki*. (a) lateral view; (b) sociuncus, dorsal view; (c) valvae, ventral view.



Fig. 13. Type habitat of *B. m. kolmaui*, Schleinitz Mts., 1260 m, central New Ireland.

A female of *B. m. kolmaui* was observed to oviposit on a fruit of *Salacia* sp. nr *disepala* (Hippocrateaceae) which was scrambling through the canopy of a tall rainforest tree. An egg collected was subsequently reared to adult and its early stages recorded. This species is possibly the foodplant for the *Deudorix* taxa observed in the area, as *Salacia disepala* (C. T. White) is a common host for *Deudorix epijarbas* and *D. diovis* Hewitson and also for *Bindahara phocides yurgama* Couchman in northern Queensland (Cooper *et al.* 1993; pers. obs.). Although *Deudorix* larvae generally pupate in the fruit previously excavated by the larva, those of *Bindahara phocides* generally pupate within narrow chambers constructed in dead wood. The mature larvae may wander for days in search of a suitable pupation site and eventually chew a small hole and pupate within. In captivity, the mature larva of *B. m. kolmaui* wandered within its confines for six days before finally boring into some soft, partially rotten wood provided. As the mature larva neared pupation, it progressively became very pinkish in colour, noticeable also in the larvae of *B. phocides yurgama* (pers. obs.). A characteristic feature of *B. phocides* pupae is a resemblance in anterior view to a small arboreal cricket (Gryllidae), no doubt a deterrent mechanism to predators. This is also characteristic of the pupae of *B. meeki*.

Acknowledgments

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